TESTIMONY OF STANLEY M. BESEN

August 15, 1995

EXECUTIVE SUMMARY

This testimony reports results on the value of distant signal programs to cable operators based on a study of cable operator behavior. The statistical analysis undertaken provides estimates of the values of various types of programs carried on distant signals and, in turn, of the shares of copyright royalty payments that should be assigned to each group of copyright claimants. Lack of data precluded estimation of the share for the public broadcasting claimants, so that the shares for the other claimants are of the available royalty pool excluding payments to public broadcasters.

For the different approaches used in the study, the share for movies and series claimants ranges between 82 percent and 92 percent of royalties, and that for sports claimants ranges between 5 percent and 11 percent. For local broadcasting and devotional claimants, the results are less certain, probably because the programming of these claimants plays a much smaller role in the cable operators' decisions regarding distant signal carriage. Although it is quite possible that the "true" shares for these categories may be lower, we have calculated share ranges between 1 percent and 9 percent for local broadcast programming claimants and between 1.5 percent and 2 percent for devotional programming claimants under assumptions that are very favorable to these claimants.

Because the estimated shares for movies and series claimants are confined within a relatively narrow range despite the use of a wide variety of model

specifications and data, and because they are based on what cable operators do rather than on what they say, they should be accorded considerable weight by the Panel.

TESTIMONY OF STANLEY M. BESEN

Biographical Information

I received my bachelor's degree in Economics from the City College of New York (1958) and both master's (1960) and doctoral (1964) degrees in Economics from Yale University. Since 1992, I have been a Vice President with Charles River Associates, Washington, D.C.

Prior to my employment at Charles River Associates, I was a Senior Economist with the RAND Corporation (1980-1992). I was previously a member of the Department of Economics at Rice University (1965-1980) where I held the Allyn R. and Gladys M. Cline Professorship in Economics and Finance. I have served as Visiting Professor of Law and Economics at the Georgetown University Law Center (1990-1991); the Visiting Henley Professor of Law and Business at Columbia University (1988-1989); a member of the Office of Technology Assessment Advisory Panel on Intellectual Property Rights in an Age of Electronics and Information (1984-1985); a member of the Regional Telecommunications Planning Advisory Committee of the City of Cincinnati (1985); a Co-Director of the Network Inquiry Special Staff at the Federal Communications Commission (1978-1980); a member of the Task Force on National Telecommunications Policy Making of the Aspen Institute Program on Communications and Society (1977); a Brookings Economic Policy Fellow at the Office of Telecommunications Policy, Executive Office of the President (1971-

1972); an Economist at the Institute for Defense Analyses (1963-1965); and an Acting Assistant Professor of Economics at the University of California, Santa Barbara (1962-1963).

I have appeared as a witness before several United States House of Representatives and Senate committees and subcommittees in hearings regarding the telecommunications industry, cable television, and intellectual property. I have also presented testimony for program suppliers on cable television issues to the Copyright Royalty Tribunal.

For approximately the past 25 years, my research has focused primarily on the telecommunications industry, both its economics and its regulation. This research has included extensive studies of cable television, and in particular analyses of entry policy, copyright, ownership, and access.

I have written the following published articles that analyze cable television: "Rate Regulation, Effective Competition, and the Cable Act of 1992," Hastings Communications and Entertainment Law Journal (1994, co-author); Regulation of Media Ownership by the Federal Communications Commission (The Rand Corporation, 1984, co-author); An Economic Analysis of Mandatory Leased Channel Access for Cable Television (The Rand Corporation, 1982, co-author); "The Deregulation of Cable Television," Law and Contemporary Problems (1981, co-author); "Copyright Liability for Cable Television: Compulsory Licensing and the Coase Theorem," Journal of Law and Economics (1978, co-author); "Economic Policy Research on Cable Television: Assessing the Costs and Benefits of Cable

Deregulation," prepared for the Office of Telecommunications Policy, Executive Office of the President (1976) and reprinted in P.W. MacAvoy (editor), Deregulation of Cable Television, American Enterprise Institute (1977, co-author); and "The Economics of the Cable Television 'Consensus'," Journal of Law and Economics (1974). A copy of my resume is appended as Attachment 1 to this testimony.

Introduction

This testimony reports results on the value to cable operators of the types of programs on the distant signals they carry. The method used to obtain these results differs from previous studies that have relied exclusively on operator statements about these values.[1] Because such statements can provide highly misleading estimates of the true valuations, the analysis reported here is based on the actual behavior of cable operators. Moreover, as described in detail below, this study controls for other factors that may influence the behavior of operators. Finally, in this study, in contrast to the studies based on cable operator statements, programs are accurately placed in the categories that were used by the Copyright Royalty Tribunal in its distribution proceedings.[2]

---

[1] See, e.g., Bortz, JSC Exhibit 1, 1989. Our criticisms of the Bortz study are not limited to its exclusive reliance on operator statements. For detailed criticisms see Besen testimony, 1989.

[2] The operators who were interviewed in the Bortz survey were almost certainly unaware of the precise composition of the program categories for royalty distribution as defined by the Tribunal. The 1990 and 1991 surveys did not attempt to provide this information to the respondents and the 1992 survey included only a very minimal description. As a result, operators are likely to have

The study finds that for the programming categories for which data were available, between 82 percent and 92 percent of royalties should go to movies and series claimants, and between 5 percent and 11 percent should go to sports claimants. The study also calculates, using very favorable assumptions, that between 1 percent and 9 percent of royalties could go to local broadcast programming claimants, and between 1.5 percent and 2 percent could go to devotional programming claimants, although it is quite possible that the "true" shares for these latter two categories are zero. Lack of data precluded estimation of the share for the public broadcasting claimants so that the shares for the other claimants are of the available royalty pool excluding payments to public broadcasters.

Basic Premises

The first premise of this study is that obtaining accurate measures of the value to cable operators of the programs on the distant signals they carry requires an analysis of actual operator behavior. This means that one must measure what operators are willing to pay for programs by observing what they actually choose to pay for them. Previous attempts to measure value by asking operators

---

misclassified some programs in responding to the surveys. For example, although copyright owners of programs like professional wrestling and stock car racing are among the movies and series claimants, cable operators are likely to have identified these as sports programs.

hypothetical questions about how they would spend a given amount of money on programming suffer from numerous technical shortcomings.

Among other difficulties, these attempts suffer from the fundamental problem that what people say they will do in given circumstances may be a poor indicator of what they actually will do. Thus, one recent review noted that:

> ...purchases in the marketplace require the removal of real dollars from one's wallet, whereas responses to a survey do not. Because the survey responses do not require the same level of consideration and financial commitment that real purchases do, the responses may be wafted this way or that by all sorts of conscious or unconscious influences: a wish to get the interview over quickly, a wish to appear reasonable, polite, or knowledgeable in the eyes of the interviewer, and so on.[3]

The results of surveys that are based solely on cable operator statements cannot be taken at face value. Moreover, no attempt has been made to "calibrate" the responses to these surveys using actual marketplace behavior. The results reported here, which are based on an analysis of actual operator behavior, are intended to overcome these shortcomings.

---

[3] Michael Kemp and Christopher Maxwell, "Exploring A Budget Context for Contingent Valuation Estimates," in Jerry Hausman (editor), Contingent Valuation: A Critical Assessment (1993), p. 219. These authors also note (p. 221) that:

> ...even for marketplace commodities as familiar to respondents as automobiles and refrigerators, projecting even near-term demand on the basis of purchase intentions requires that we do not accept responses at face value. Rather, the responses are usually analyzed using empirically based techniques and algorithms that calibrate the survey responses by reference to marketplace experience.

The second premise of this study is that the value to cable operators of the various kinds of distant signal programming is reflected in the royalty payments that operators must make for that programming. Those payments, in turn, will reflect the additional revenues earned by the operators from carrying an additional program of each type. Thus, for example, the value to the cable operator of another hour of sports programming would be the additional revenue earned by the operator from carrying that additional program, that is, the marginal value of the programming.[4] Indeed, in a market unencumbered by the compulsory license, the market-clearing price for an hour of programming in a particular category would be equal to the additional revenues generated by an additional hour of such programming.

Although cable operators do not pay copyright owners directly for the programs on distant signals, the compulsory license fees they pay do depend on the number of signals they carry. Operators will add distant signals only if the increase in revenue that is attributable to the programs on those signals is at least as great as the additional royalty payments the operators must make to carry the signals. A profit-maximizing cable operator will, therefore, continue to add distant signals to its channel lineup until the additional net revenues generated by each distant signal are just equal to the additional royalty payments.[5] Changes in

---

[4] See Besen 1989 testimony. It should be understood that subsequent references to the value of an additional signal or program are to marginal, not total, value.

[5] As long as the revenues generated by the programming on an additional distant signal exceed the required increase in royalty payments, the operator should add the distant signal to the lineup;

royalty payments will thus accurately reflect the additional revenues earned as a result of the carriage of an additional distant signal and the programs it contains.

Operators are willing to make additional royalty payments to the extent that the carriage of additional signals increases: (1) the rate they can charge for the service on which the signals are carried; (2) the number of subscribers to that service; (3) net revenues from other services that are taken by viewers who are attracted to the cable system by the additional signals;[6] and/or (4) advertising revenues.[7] Similarly, operators will delete distant signals if the associated reduction in royalty payments is at least as great as the reduction in revenues from these sources. Thus, the decision of an operator to incur additional royalty payments by carrying additional signals reflects the value of the programs on those signals to the operator.

---

adding such a signal will increase revenues more than costs, thereby increasing profits. If operators could air only some of the programming on a distant signal and incur proportionately smaller royalty costs, they would continue adding distant signals until the condition in the text were satisfied. However, because operators cannot "cherry pick" among distant signal programs in this way, they will continue adding distant signals as long as the increase in revenues is greater than or equal to the increase in royalty payments.

[6] Some viewers who become basic cable subscribers when the number and/or identity of distant signals changes will also choose to subscribe to expanded basic and premium services. The per-subscriber fees that a cable operator pays for the carriage of other services may also be affected by the number of basic subscribers it serves. The additional revenues from these services, net of any additional costs, will affect the willingness of cable operators to pay for programs on distant signals.

[7] Some viewers who are attracted to the basic service by improvements in the complement of distant signals will watch other services on which the cable operator can sell advertising spots. The additional advertising revenues that are generated will affect the willingness of cable operators to pay for the programs that appear on the distant signals.

When a system adds or drops a distant signal, we can in fact observe changes both in royalty payments and in the mix of distant signal programming that is carried. The statistical problem is to ascribe changes in royalty payments, and therefore additional operator revenues from all sources, to the changes in the kinds of distant signal programming carried by the cable system.

Because not all systems add or delete the same distant signals, because different distant signals contain different mixes of programs, and because the change in royalty payments when a distant signal is added will not be the same for all systems, we can statistically infer the proportions of the increase in royalty payments that are due to the changes in the amounts of programming in each program category. Some systems will choose, say, to add more "expensive" distant signals with programs that generate greater additional revenues than other systems that add less "expensive" distant signals. It is these differences that permit us statistically to allocate the changes in royalty payments among the various programming categories.[8]

Instead of analyzing the changes in royalty payments, we might have attempted to analyze the effects of the various types of programming on distant signals on the levels of royalty payments. Such an analysis would have required us to control for a large number of other factors that influence these payments,

[8] Because changes in royalty payments will depend on the basic revenues of the system, the addition of any given distant signal is likely to result in much larger increases in royalty payments for larger than for smaller systems. To control for these differences, we analyze the percentage changes in royalty payments. We provide a detailed description of our methodology below.

because these payments depend on the basic revenues of the system. These factors include the number and types of local over-the-air signals and the economic and demographic characteristics of the markets in which cable systems operate, as well as other services offered by cable systems to their subscribers.

To reduce the need for, and thus the difficulty in, controlling for these "other" factors, we determined instead to analyze changes in royalty payments between adjacent accounting periods.[9] That is, we attempt to explain how the amount that a cable operator pays for the carriage of distant signals changes when there are changes in the programming on those signals. The primary benefit of this approach is that we do not have to control for the effects of many factors that may affect royalty payments because they are not likely to change significantly between the accounting periods we analyze.[10]

In our analysis, we examined only those changes in royalty payments that occurred when a cable system added or deleted a distant signal, or replaced one distant signal with another. We could, instead, have assessed changes in royalty payments regardless of whether there were any changes in the distant signal complement because changes in the programming mix can occur even if there is no change in the identity of distant signals that are carried. However, the effects

[9] The accounting periods are the semiannual periods for which cable operators make their compulsory license royalty payments.

[10] We did, however, analyze whether our results are likely to have been affected by changes in the carriage of other program services by cable systems. That analysis, which concludes that our basic results are largely unaffected, is reported below.

we wish to identify are likely to be too subtle to detect when the complement of signals carried by a cable operator does not change between accounting periods. Specifically, these programming changes are likely to be small between accounting periods, so that their influence on royalty payments will also be small. As a result, it is likely to be difficult to isolate these effects from the surrounding "noise."

On the other hand, much larger changes in program composition occur when a cable operator adds or deletes a distant signal, or replaces one distant signal with another. In these cases, there are likely to be larger changes in the number of programs in each category than where the complement of signals being carried does not change, so that the effects we seek to measure will be easier to detect. Moreover, the addition or deletion of those programming categories that are most valuable to cable operators will be the easiest to detect, and the effect of changes in those categories that play only a small role in cable operators' carriage decisions will be most difficult to detect.

In sum, what we observe in the real-world choices of cable operators are changes in royalty payments and changes in the distant signal programming mix. Because the changes in royalty payments reflect how much the signals that are added or deleted are valued by the operator, we are able to assign that value to the various programming categories that are used in the copyright royalty allocation process.

Statistical Approach

Our basic statistical approach is to relate changes in the program composition of the complement of distant signals carried by a cable system to the changes in royalty payments made by the operator when the system adds, deletes, or swaps distant signals. In this way, we can measure the value of different types of programs to an operator by observing its actual behavior and thus infer the appropriate share of cable compulsory license royalties to be allocated to each copyright owner group.[11]

When a cable operator changes the complement of distant signals it carries, this generally results in a change in its royalty payments. This change occurs both because basic subscriber revenues may have changed and because, under the compulsory license, royalties depend on the number of distant signals that are carried.

Many outcomes are possible. Basic subscriber revenues may not change, but royalty payments may increase as distant signals are added. Basic subscriber revenues may increase with no accompanying increase in the royalty rate if one

[11] This approach is similar to a "hedonic" analysis, a technique used frequently by economists, that relates the prices of different goods and services to the "attributes" of these goods or services. For discussions of this approach see Sherwin Rosen, "Hedonic Prices and Implicit Markets," Journal of Political Economy (January/February 1974), pp. 34-55; and Jack Triplett, "The Economic Interpretation of Hedonic Methods," Survey of Current Business (January 1986), pp. 36-40.

distant signal is replaced by another.[12] Or, finally, both basic subscriber revenues and the royalty rate may be affected when there is a change in the complement of distant signals carried by a cable system.

If there is no change in basic subscriber revenues, the additional royalty fees[13] must at least be matched by additional net revenues from other sources, e.g., advertising revenues, revenues from other tiers, etc.[14] If basic revenues increase, any increase in royalty payments must be less than or equal to the increase in basic subscriber revenues plus any increase in net revenues from other sources. In all cases, the additional royalty payments must be justified by the increase in net revenues from all sources.

What triggers this increase in net revenues is, of course, the carriage of an additional distant signal, or a "swap" of one distant signal for another. These changes, in turn, change the mix of programming on distant signals that a cable operator offers to its subscribers. Thus, depending on which signals are added, dropped, or swapped, the mix of movies and series, sports, devotional, local, and public broadcasting programs will change.[15] An increase in the number of distant signals that are carried will occur only if the programs on the additional signals

---

[12] As noted above, the increase in basic subscriber revenues may reflect an increase in the number of subscribers, an increase in basic service rates, or both.

[13] We discuss a change that increases royalty payments, but we could, as well, have considered a change that reduced those payments.

[14] Recall that any changes in the fees paid to carry other program services that result from a change in basic subscriptions are included in this calculation.

[15] Recall that the empirical analysis does not take public broadcasting programs into account.

generate additional revenues that more than offset the associated increase in royalty payments, i.e., only if their value is greater than their additional cost.

Cable operators are willing to make large additional royalty payments only if the value to them of the programs on the additional distant signals is large. On the other hand, cable operators are willing to add distant signals with programs of relatively low value only if the associated increase in royalty payments is small. Thus, we would expect larger royalty payment increases to be associated with increases in the carriage of distant signals that contain especially highly-valued programs.[16] By relating statistically the changes in programming that result from changes in distant signal carriage to changes in royalty payments, we are able to measure the value to the cable operator of that programming.

Consider a hypothetical cable operator that makes royalty payments, R_0, in period zero, t_0. During that period, the operator carries distant signals that together provide M_0 hours of movies and S_0 hours of sports programs.[17] Now suppose that the cable operator carries a different complement of distant signals in the next period, t_1, and that, as a result, program hours change to M_1 and S_1, respectively.

The percentage change between the two periods in the royalty payments made by the operator, $(R_1 - R_0)/R_0$, is called R'. We call the percentage change in

[16] Again, the value of programs to an operator depends on the associated increases in revenues from all sources that those programs generate.

[17] We assume that there are two types of programs on the distant signals for notational simplicity. The complete analysis considers local, movies and series, devotional, and sports programs. Below, we consider whether hours alone should be the sole measure of programming inputs.

the number of hours of programs in the movie and sports categories between these periods S' and M', respectively.[18] The basic equation we estimate is:

$$R' = aM' + bS'.$$ [19]

Each observation used to estimate this equation is an instance in which a cable operator has either dropped, added, or swapped distant signals. The dependent variable measures the percentage change in royalty payments made by the operator between the period prior to the change in distant signals, t_0, and the period in which the change occurred, t_1. The explanatory variables are the percentage changes in the number of hours of movies and sports programming, respectively, on all distant signals that result from the addition, deletion, or swap.[20] It is that change in the programming mix that is associated with the change in royalty payments.

As an example, suppose that in t_0, the cable operator carried 150 hours of movies and 50 hours of sports on distant signals. If it added a distant signal that resulted in the carriage of 240 hours of movies and 60 hours of sports in t_1, M' = (240-150)/150, or .60, and S' = (60-50)/50, or .20.

---

[18] These percentage changes are calculated in the same manner as is the percentage change in royalties. The use of percentage changes permits us to control for differences in the size of systems.

[19] This is equivalent to treating the logarithm of royalties as a function of the logarithm of program hours.

[20] As we discuss below, in estimating our basic equation we weighted these hours by a measure of viewing to account for "quality" differences in the programming carried by any particular distant signal as well as differences in viewing levels across dayparts.

By estimating statistically the coefficients of each of the explanatory variables in these equations, we can determine the effect on the royalty payment of a given percentage change in hours in each of the program categories, holding constant the percentage change in the number of hours in the other category. The coefficient of M' ("a" in the above equation) measures the percentage change in royalty payments that accompanies a 1 percent change in the number of hours of movies on the distant signals carried by the system, holding constant the number of hours of sports programs. The coefficient of S' ("b" in the above equation) measures the same effect for sports programs.

Since the willingness to make a larger royalty payment reflects the value of the programs on the additional distant signal, the estimated coefficients permit us to measure the value to the operator of the two types of programs and, in turn, to estimate the appropriate shares of the compulsory license payments to be assigned to each.[21] Since the entire change in royalty payments must be ascribed to one or another of the programming categories, our estimated shares should sum to one. Otherwise, the changes in the programming either will not explain all of the change in royalties, or will suggest higher (or lower) royalty payments than

[21] The empirical analysis is constructed in a such a way that "a" and "b" represent the shares of total royalties for each program category (i.e., the underlying royalty equation is log linear) for each system in each time period. As described below, we tested the sensitivity of this assumption by ascertaining whether the shares varied over time or by system size and found no such sensitivity.

those that are actually paid.[22] In fact, our approach results in estimated coefficients that do not sum precisely to one, so we have adjusted the estimated coefficients to reflect this condition. This is preferable to constraining the sum of the shares to one in the estimation process itself. However, we also tested whether the estimated sum of the shares is significantly different from one, and could reject that hypothesis in every case but one.

Although the basic statistical approach we have taken can be described simply, its implementation was far from simple. We dealt with six major issues: (1) the period of analysis; (2) identification of distant signals; (3) resolution of data problems that might be associated with any particular observation; (4) measurement of program "inputs"; (5) choice of functional form; and (6) treatment of additional variables. The first four of these issues are discussed in this section. We have already addressed the choice of functional form by our decision to analyze percentage changes in, rather than levels of, royalty payments. Below, we describe how we considered the possible effect on our estimates of contemporaneous changes in the carriage of other program services. The remaining issues are discussed next.

---

[22] A similar point is made by Roseanne Cole et al., "Quality-Adjusted Price Indexes for Computer Processors and Selected Peripheral Equipment," Survey of Current Business (January 1986), p. 47.

The Period of Analysis

As already discussed, we confined our analysis to situations in which a cable operator either added or deleted a distant signal between two accounting periods, including cases in which an operator deleted one signal and replaced it with another. To assure that we had a reasonably large sample of observations, we began our analysis in accounting period 1988-II, the second half of 1988. Thus, the first changes in the complement of distant signals we examined were those that occurred between 1988-I and 1988-II. The final changes were those that occurred between 1992-I and 1992-II. Although we could have gone back somewhat further in time, we were concerned that changes in structure might have rendered earlier observations unrepresentative of later ones. Most importantly, cable rate deregulation was largely completed by the beginning of the period we analyzed and had not yet been reimposed by the end of the period.[23]

The initial dataset was obtained from Cable Data Corporation. It contained information on any system that had changed its carriage of distant signals between 1987 and 1992 and that was a Form 3 system at any time during this period. It also contained information indicating whether the signal was classified as distant or local for that system during a particular accounting period. Finally, the dataset

[23] We should note here that we did not assume that the underlying equation remained unchanged within the period of analysis. Below we report the results of testing the homogeneity of our model throughout the period of analysis.

provided information about system receipts and royalty payments for each accounting period.

Identification of Distant Signals

The analysis we conducted requires information on whether the complement of distant signals carried by a cable system changed between accounting periods. For many systems, these data can be obtained straightforwardly from reports submitted to the Copyright Office and reported to us by Cable Data Corporation. Thus, if a distant signal appears in the report in one period and is absent in the next, it represents a change between the two periods in the complement of distant signals carried by a cable system.[24] However, the data contain some instances in which a signal is present in consecutive periods but is classified as a local signal in one period and a distant signal in the next, or vice versa. Such observations, in which the only change in reported distant signals represented a change in reporting status, were not considered in our analysis.[25]

There were, however, instances in which a distant signal was added or deleted by a system for which another signal had changed classification during the accounting period. The question here is how to treat the reclassified signal for the

[24] A signal is considered "added" in the first period in which the signal appears. A signal is considered "dropped" in the first period in which it is not carried. Because reports are made semi-annually, we cannot determine at what point within a reporting period a change occurred.

[25] Other observations were omitted because the programming data on the distant signals that were added or deleted were not available.

purpose of calculating the percentage changes in programming in various categories. Should, for example, a signal that has been treated as distant in the past be treated as local if it is so classified in the present? We concluded that, for this purpose, we should treat these signals as distant in all periods because their programming affects the additional value of other distant signals that are added or deleted.[26,27]

Next, we matched the resulting observations with available data on the programming on these signals.[28] Program data are available only for signals with significant viewing in cable households.[29] After deleting those observations for which complete programming data were unavailable and for which any percentage change calculation was not possible (because of division by zero), we had 423 remaining observations.

---

[26] If a system dropped two distant signals in the same accounting period, this represents a single change. Some observations were deleted prior to this point because of obvious lapses in data collection; e.g., a system reported the carriage of no signals during a period although it reported the carriage of signals both before and after that period, or because the system had started or ceased operation. We also deleted observations for Guam, Puerto Rico, the Virgin Islands, and U.S. territories.

[27] Excluding those observations for which a carried broadcast signal changed classification from distant to local (or vice-versa) yields results similar to those reported for our "basic" equation below.

[28] These data were obtained from the Household Viewing Hour Analysis, conducted by the A.C. Nielsen Company and Cable Data Corporation and supplied to us by the Motion Picture Association of America (MPAA). The data were obtained from three months of station behavior in each accounting period. In those cases where station programming information was obtained for only one or two months of the six-month reporting period, those data were "blown up" to obtain estimates of program hours comparable to those for stations with three months of data.

[29] Stations were included in the dataset only if their viewing in distant cable households exceeded some minimum level, between 80,000 and 100,000 households depending on the year. As a result, all signals with significant cable carriage are included in our analysis.

Resolving Possible Data Problems

Three issues raised questions about the appropriateness of some of the observations. First, some systems changed form status at the time of a change in distant signal carriage; as a result, the copyright royalty schedule for the cable operator shifted, a shift that could have affected the operator's willingness to add or drop distant signals and that might require an adjustment period longer than an accounting period. To ensure that such changes did not "contaminate" our results, any observations that coincided with a change in form status were excluded from the sample. This resulted in the deletion of 23 additional observations.

Second, the dataset contained a large number of observations for which the change in basic rates during the accounting periods in which a signal was added or dropped was very large. Such a change could be the result of the addition (or deletion) of cable programming services at the same time as the distant signal change, or it could be the result of retiering at the same time as the distant signal change. To insure against the possibility that the effects of these changes on royalty payments would be inappropriately ascribed in the statistical analysis to a change in distant signal programming, we deleted all observations for which the basic rate changed by more than $1 per month (December 1993 dollars) at the time of a change in distant signal carriage. This resulted in the deletion of an additional 144 observations.

Finally, a number of observations contained data for basic rates and subscribers that appeared inconsistent with the reported gross receipts data. That is, there were a number of instances in which the basic monthly rate multiplied by the number of subscribers, multiplied by six months yielded estimated gross receipts that were substantially different from the figure provided by the operator. While it is possible that the basic rate during the accounting period changed before the end of the accounting period, some of the differences were substantial enough to raise doubts about the accuracy of the data. As a result, we deleted an additional 48 observations for which the difference between the calculated gross receipts and the figure provided by the operator was greater than 20 percent (which we understand is consistent with the criteria used by MPAA when assessing the accuracy of reported gross receipts).

The final "clean" dataset consists of 208 observations, for 171 unique cable systems. [30]

Measurement of Program "Inputs"

For each observation in which there was a change in the complement of distant signals, we obtained data on the change in the total number of hours for each program category carried by the cable system.[31] We adjusted these data to

[30] Of these 208 observations, 178 represent distant signal changes by Form 3 systems and 30 represent distant signal changes by Form 2 systems.

[31] Actually, the data are reported in quarter-hours, but since we employ percentage changes the difference is immaterial.

reflect differences in viewing of the programs in particular categories.[32] To carry out this adjustment, we weighted the hourly programming data by the viewing hours in cable households for the particular program category on a distant signal divided by the total viewing hours in cable households of that signal. This adjustment permits us to take into account differences in program "quality" -- to the extent that viewership is correlated with quality -- as well as differences in viewing levels across dayparts.[33]

When weighted hours are used in the analysis, a program category that attracts a disproportionately large amount of viewing will be specified as containing a larger proportion of programming "inputs" than its proportion of program hours. Thus, more popular programming, or programming aired during prime time, is accorded a higher weight than less popular programming or programming aired in the early morning hours. An analysis accounting for "quality" differences across programming categories within a distant signal is conceptually superior to one that weights each hour of programming identically.

The effect of this quality adjustment can be quite dramatic. For example, in 1991-I, one of our observations (system ALD200) carried 13,440 quarter-hours of distant signal programming, 730 of which consisted of sports programming. After

---

[32] The viewing data are from the Household Viewing Hour Analysis for each year.

[33] For an early example of the use of "quality" adjustments for inputs, see Zvi Griliches, "Estimates of the Aggregate Agricultural Production Function from Cross-Sectional Data," Journal of Farm Economics, XLV (May 1963), pp. 419-428.

adjusting the "raw" hours for viewership, we assigned 1,738 of the 13,440 quarter-hours to sports. More generally, the viewer-weighted hours of distant signal sports programming are typically more than double the unweighted hours of sports programming. The gains to sports programming from weighting come at the expense of the other three programming categories, primarily local and devotional programming.

Basic Statistical Results

In this section, we report the results of estimating our basic equation. Our basic equation is from an analysis in which: (1) the program categories are defined in terms of weighted program hours; (2) data are contemporaneous, i.e., the change in royalty payments and the change in programming hours occur during the same period;[34] (3) the Form change filter, the $1 real monthly rate change filter, and the 20 percent gross receipts difference filter are used to delete observations; and (4) no attempt is made to account for possible differences in the structure of the equation among periods. None of the variants of the basic equation reported below can be viewed as statistically superior to the basic equation.[35] In addition, while there are differences between the results from the

[34] None of the coefficients were statistically significant in an analysis in which changes in programming were related to changes in royalties in the period subsequent to the drop or add.

[35] By "statistically superior" we mean that there is little difference in the ability of the equation to "explain" percentage changes in royalty payments.

basic equation and those obtained using other specifications or data, those differences are typically small.

In Table 1, we present the results for our basic equation in which the percentage changes in hours in each of the four program categories -- local, movies and series, devotional, and sports -- are the independent variables, and the percentage change in royalty payments is the dependent variable.[36]

The coefficient of the movies/series hours variable, which can be interpreted as the percentage increase in royalty payments in response to a 1 percent increase in weighted movies/series hours, is positive and very significantly different from zero. To understand roughly what "significantly different from zero" means for this coefficient, assume hypothetically that we had estimated the basic equation 10,000 times using a different sample each time. Roughly speaking, we would have estimated a coefficient for movies/series hours as large as that reported in Table 1 less than one time out of the 10,000 if there were no "true" relationship between movies/series hours and royalty payments. The coefficient for sports programming is also positive, but falls just short of significance at conventional levels of statistical "confidence." Roughly speaking, there would be

[36] All tables can be found in Attachment 2. All equations in Table 1 were estimated using ordinary least squares. Because the sum of percentage changes is not the percentage change of the sum, one cannot test to determine whether separating total hours into program categories results in a significant reduction in the unexplained variance of the dependent variable, R'. However, in terms of the explanatory power of the analysis, the total hours regression performs no better than a regression in which program hours are separated into categories. For an accessible discussion of the use of statistical analysis in legal proceedings, see Franklin M. Fisher, "Multiple Regression in Legal Proceedings," Columbia Law Review, 1980.

less than a one-in-ten chance that we would have estimated this coefficient if there were no relationship between sports hours and royalty payments. The coefficient of movies/series hours, which is 11.2 times the coefficient of sports hours, is significantly different from that of sports hours.[37]

The coefficients of devotional program hours and of local program hours are both negative, but both are very far from statistical significance.[38] That is, we cannot reject the possibility that the "true" coefficients of these programming categories are zero. Relative to the size of these coefficients, the "margin of error" for each is substantial. Roughly speaking, the estimate of the coefficient of sports programming is seven times more precise than that of devotional programming and four times more precise than that of local programming.[39] This is not a result one would expect if local and devotional programming played an important role in the cable operator's carriage decisions.

Finally, the sum of all of the coefficients is not significantly different from one.[40] If the coefficients of the explanatory variables in the equation were positive

---

[37] The calculated F value is 25.75 for 1 and 203 degrees of freedom. The difference between these two coefficients is significant in all the equations reported in Table 1.

[38] Although a firm would never purchase an input that has a negative marginal product, cable systems must carry distant signals intact and cannot delete local and devotional programs even if their value is negative.

[39] Technically, the measure of precision used with respect to devotional programming is the ratio of the calculated t-statistic for the coefficient of sports hours to the t-statistic for the devotional programming coefficient. An analogous calculation was performed for the sports-local comparison. Of course, the relative precision of the estimated movies/series coefficient is much higher; indeed, it is nearly four times more precise than that for sports.

[40] This result obtained in all but one of the equations reported below.

and actually summed to one, the respective coefficients would directly measure the shares of the various programs. We could calculate these shares by eliminating all negative coefficients and scaling the remaining coefficients so that they sum to one. In that case, local and devotional programming claimants would be assigned a zero share of the royalties (which would be consistent with our statistical results); movies and series programming claimants would be assigned a 91.8 percent share and sports programming claimants would be assigned an 8.2 percent share.[41]

An alternative approach is to assume that, with a very large sample, the coefficients for local and devotional programming would in fact be positive (albeit small). One estimate of such "pseudo-shares" is the estimated coefficient plus the "margin of error." For example, the margin of error for the coefficient for devotional programming (-.0025) is about .0208,[42] so that the "pseudo-share" would be about .018.

It is important to emphasize that there is no statistical reason to believe that the coefficients for local or devotional programming are in fact positive. The actual

---

[41] Strictly speaking, our statistical results would also be consistent with assigning sports a zero share because the coefficient of sports programming is not significantly different from zero at conventional levels. However, the coefficient is consistently positive (unlike local and devotional programming whose coefficients are almost always negative), is estimated with a degree of precision that far exceeds that for the remaining two coefficients, is not far from significance in the reported equations, and is in fact significant in one of the equations reported below. Thus, there is a reasonable chance that with a larger sample with the same characteristics as that used here, sports would have a positive coefficient. To be conservative, we used the estimated coefficient as the basis for the share calculations.

[42] This is typically 1.96 times the standard error of the coefficient. Technically, we will be using the upper bound of the 95 percent confidence interval for the positive estimate of the coefficient.

carriage decisions in our sample do not indicate that cable operators consider local and devotional programming as valuable to their subscribers. Moreover, the approach we have taken can have the perverse result that, as the imprecision in the coefficients for local and devotional programming increases, i.e., the margin of error grows larger, the pseudo-share of royalties ascribed to the local and devotional programming claimants increases. Put simply, this method is likely to overstate the royalty shares due these two groups.

With these significant caveats, using the basic equation to estimate the shares of the four claimant groups (after scaling to ensure that the coefficients sum to one) yields the following:

Program Category	Share
Movies/Series	.855
Sports	.077
Devotional	.018
Local	.050[43]

We should emphasize that our approach allows for the possibility that a program category may obtain a share that is substantially different from its share of weighted or unweighted hours. This will occur if a category's individual programs

[43] We also estimated the basic equation using only the 178 Form 3 systems in our sample. The resulting share estimates are generally consistent with the results reported in the text, with two important caveats. First, the coefficient for local programming is negative *and* statistically significant; we therefore would assign a zero royalty share to the local programming claimants based on this estimation. Second, the coefficient for sports programming is positive *and* statistically significant.

are valued more or less highly than the average of all programs, as is apparently the case for movies/series programs. This point is most apparent for local programming on distant signals. For our sample observations, local programming on distant signals accounted for 9 percent of all hours and about 3 percent of viewing hours, yet our results indicate that, from the perspective of the cable operator, adding local programming to a distant signal may not contribute to the value of the distant signal.[44]

Additional Statistical Results

The purpose of this section is to report on our analysis of the sensitivity of our basic results to a number of variations in either data or the specification of our equation. We find that none of these variations has more than a small effect on the estimated shares. In some cases they increase the estimated share of movies and series programs above those in our basic equation, and in other cases they reduce it. In no case is the change large enough to affect the basic conclusions of the previous analysis.[45]

---

[44] One might also note that the fact that sports programming has a relatively small share of total royalties does not necessarily mean that the value per sports program is small. It may only mean that the number of sports programs is relatively small. The value of each sports program may substantially exceed that of each movie or series, but sports would still be entitled to only a small share of the royalty fees.

[45] The statistical results are reported in Table 1.

Time Effects

In estimating our preferred equation, we implicitly assumed that the equation was the same in all periods we analyzed. Here, we report the results of estimating a version of our equation in which we allowed for differences in the equation across periods. In particular, we included binary variables in the equation to indicate the year from which the observation was drawn.[46] None of the binary variables had a significant coefficient; nor were the variables significant as a group.[47] However, in this equation, the coefficient for sports programming was statistically significant at conventional levels.

Despite the lack of significance of any of the time variables, we have, nonetheless, estimated shares for this equation; these are broadly similar to the shares we obtained using the basic equation. While the share of movies and series declines, that of sports programming increases, and those of local and devotional programming are virtually unchanged.

---

[46] See, e.g., P. Rao and R.L. Miller, Applied Econometrics, Belmont, CA: Wadsworth Publishing Company, 1971, pp. 88-93, for a discussion of this technique.

[47] We also used the analysis to test whether any of the coefficients of the programming categories changed over time by allowing each programming category to have a different coefficient in every year. The results indicated that permitting the coefficients to vary across years did contribute to the explanatory power of the regression. However, the interrelationships among the additional variables (as well as the addition of those variables themselves) that permit estimation of the year-specific coefficients substantially reduced the ability of the regression to estimate any of the coefficients with precision. To determine if this same apparent coefficient instability existed during the 1990-92 period, i.e., the period for which the royalties will be allocated, we re-estimated the basic regression for just those observations, again permitting the coefficients of the programming categories to vary on an annual basis. In this case, we could reject the hypothesis that these coefficients varied across time. The results for the basic equation estimated just for this sub-period (but without the time-specific effects) are reported below.

The estimated shares are:

Program Category	Share
Movies/Series	.821
Sports	.111
Devotional	.017
Local	.051

These results show clearly that the inclusion of time effects has relatively small effects on the estimated shares.[48]

Filter Sensitivity

We also assessed the extent to which our results were sensitive to the data filters chosen. First, we estimated the shares by increasing the level of tolerance for the difference between calculated and reported gross receipts. Instead of eliminating any observation for which the difference exceeded 20 percent, we deleted only those for which the difference exceeded 30 percent. The resulting share estimates are as follows:

[48] In addition to assessing the sensitivity of the analysis to the time period of the observation, we also tested its sensitivity to system size. Specifically, we permitted the coefficients of the programming hours to be different for systems with more than 10,000 subscribers. The addition of variables in the regression equation to permit these varying coefficients did not improve the explanatory power of the regression in a statistically significant way. We repeated this analysis for systems with more than 25,000 subscribers and then for systems with more than 50,000 subscribers with similar results.

Program Category	Share
Movies/Series	.860
Sports	.071
Devotional	.017
Local	.052

The shares are virtually identical to those obtained from our basic equation.

We then eliminated both the gross receipts filter and the basic rate filter. This change resulted in a near-doubling of the number of observations, to 400. As compared to the basic equation, the estimated shares display only small changes:

Program Category	Share
Movies/Series	.892
Sports	.046
Devotional	.022
Local	.040

The estimated share for the movies/series claimants increases, largely at the expense of the sports claimants. Again, however, the results are generally similar to those in the basic equation.

The 1990-92 Regression

The royalties to be distributed in this proceeding do not cover all of those collected between 1988-I and 1992-II, but only those collected between 1990-I and

1992-II. To assess whether our results would change in any substantial way if we had conducted our analysis only for this period, we estimated the basic equation for this period alone. One difficulty with considering only this subset of observations is a substantial loss in observations (78) and, therefore, a potential loss in the precision of the estimates.

The most significant difference between the share estimates here and those from the basic equation is that movies and series gain at the expense of local programming. There is little change in the estimated shares due the sports and devotional claimants. The estimated shares are:

Program Category	Share
Movies/Series	.915
Sports	.064
Devotional	.015
Local	.007

Of the analyses reported in Table 1, this equation has the greatest degree of explanatory power, albeit by a relatively small margin.

The Effect of Changes in Other Program Services

As we indicated in our previous discussion, one of our primary motivations for analyzing changes in royalties and program hours rather than their absolute levels was to reduce the need to control for factors that might be expected to affect

the level of royalties but not changes in them. Thus, slowly-changing variables, such as market demographics, or the number and types of broadcast stations in a market, can safely be ignored because they are unlikely to change significantly during the brief periods in which there is a change in the complement of distant signals carried by a cable system. Consequently, by analyzing changes in royalties, we effectively control for such variables.

One factor that could be a concern, however, is the possibility of significant changes in the number of non-broadcast cable program services that occurred contemporaneously with changes in the carriage of distant signals. Our concern here is that a system might have added a distant signal at the same time as it began carrying a particular cable program service, say TNT or ESPN. If adding a distant signal tended to be accompanied by the carriage of a particular cable program service, we could erroneously ascribe to a distant signal programming category an increase in royalty payments that is really due to higher basic revenues because of the addition of a new cable programming service.[49]

As already noted, one way in which the analysis reported here guards against such spurious correlation is to delete all observations for which the basic rate increased by more than one dollar. That is, any substantial change in the offering of cable programming services is likely to be accompanied by a substantial

[49] Note that the omission of this factor would be important for our purposes only if it affected the relative values of the coefficients in our equation.

change in the basic rate or by retiering. Such observations have been excluded from this analysis.

Nonetheless, we asked MPAA to identify changes in the other program services that a cable system carried for each of the observations in the sample used here drawing data from the Television/Cable Factbook for the years 1987-1993. MPAA's effort to satisfy our request was greatly hampered by the fact that the Factbook data on the service lineups of cable systems were not always available for the periods we wished to examine. For example, we might have an observation on a change in distant signal carriage in the first half of 1989, but have the service lineup for that system in the 1989 Factbook be for 1987.

In attempting to overcome this difficulty, we directed MPAA to identify the closest Factbook dates prior to and subsequent to the beginning date of the accounting period in which the change in distant signals occurred.[50] We then discarded an observation if both dates were not within 8 months (240 days) of the beginning of the accounting period in which the change occurred. This screening procedure, which was intended to insure that the changes in the carriage of other program services were (very) roughly contemporaneous with the changes in distant signals, resulted in 35 usable observations.

[50] The Factbook entries usually provide the date on which the observation of the reported cable system lineup was made. We employed these dates, which we call the Factbook dates, and not the dates of the Factbook issues.

Next, we chose a set of cable program services for which we wished to identify changes that might have affected our estimated coefficients. These services, which included all of the major cable program services, were AMC, A&E, BET, CNN, Encore, Nostalgia, ESPN, other sports channels, the Family Channel, CNN-Headline News, Lifetime, MTV, Nickelodeon, TNN, TNT, the Weather Channel, Univision, USA, VH-1, home shopping channels, the Disney Channel, and other (non-sports) pay services.

Using the data compiled by MPAA, we determined whether there was a relationship between the percentage changes in each of our programming categories, the explanatory variables in our equation, and percentage changes in the number of cable program services offered by each sampled system. If no correlation existed, we could be fairly certain that our estimated coefficients were unaffected by changes in the carriage of other program services.

We examined the relationships between the percentage changes in hours carried for each of our programming categories and percentage changes in: (a) the total number of major non-broadcast cable services; (b) the total number of USA, A&E, American Movie Classics, TNT, and the various premium movie services; and (c) the number of sports services.[51] There was no relationship at the five percent level of significance, or significance levels considerably higher, for three of

[51] None of the observations involved a change in the carriage of ESPN. Category (b) is intended to be a representative collection of cable services that primarily carry movies and series programs.

the four programming categories (movies/series, sports, and devotional programming).[52]

However, we did find a significant relationship between percentage changes in local programming and (a) and (c) above. This raises the possibility that the estimated coefficient for the percentage change in local programming hours in the previously estimated equations is biased downwards. Determining with any significant degree of confidence how substantial that bias might be is difficult because only a small fraction of our observations could be matched with the Factbook entries.

Nonetheless, to determine whether there was any evidence of substantial bias, the basic equation for these 35 observations was estimated with variables representing (a) and (c) included as explanatory variables. The results appear in the bottom row of Table 1. As with the other estimated equations, the coefficient for movies/series is positive and statistically significant while that for sports is positive but insignificant at conventional levels of confidence. Unlike the other equations, however, both local and devotional programming now have positive coefficients, but like the other equations, both coefficients are highly insignificant. That is, it is quite possible that the "true" coefficients (and therefore the royalty

[52] We also tested the sensitivity of our analysis to the length of the data screen used in collecting data from the Factbook by using ten-month (300 days) and twelve-month (365 days) screens. Our results were virtually unchanged when these screens were used. The analysis with the ten-month screen is based on 43 observations; that with the one-year screen is based on 57 observations.

shares due these claimants) are zero, or some other very small number. Thus, even after accounting for contemporaneous changes in cable programming services, there is still no evidence that cable operators regard the carriage of local and devotional distant signal programming as valuable either to them or to their subscribers.

Nonetheless, we used the coefficients from this equation to estimate the shares due each of the claimants. The results are as follows:

Program Category	Share
Movies/Series	.822
Sports	.070
Devotional	.020
Local	.089

Only the estimated share that is due to local programming claimants is higher than any of the previous estimates of their share. Nonetheless, as noted above, the coefficient of local programming is still measured with such imprecision that the "true" share could be considerably less than that estimated here.[53] Moreover, it should be emphasized that these results are obtained using only 35 observations.

[53] The results reported in the text are sensitive to the use of the ten-month or twelve-month screens in compiling the Factbook data. That is, the relationship between the percentage change in local programming hours on the one hand and the percentage change in major non-broadcast programming services and cable sports programming services on the other hand was statistically insignificant for each of these screens, with one exception. In the case of the ten-month screen, there was a significant relationship between the percentage change in local programming hours and the percentage change in the number of major non-broadcast services offered. However, inclusion of this latter variable in the estimation of the basic equation results in share estimates that are within the range of those described in the text.

Summary

It is convenient to summarize the results of this section by comparing the estimated shares from the various alternatives to the shares that are estimated from our preferred equation. Table 2 provides this comparison. As is apparent, the results are highly consistent across the various alternatives. The share of movie/series programs ranges between 82 percent and 92 percent; the range for sports programs is between 5 percent and 11 percent; that for devotional programs ranges between 1.5 and 2 percent; and that for local programming ranges between 1 percent and 9 percent.

Sample Representatives

Finally, we examined the possibility that systems that changed their distant signal complement are different from the universe of Form 3 systems that account for virtually all of the copyright royalties. Table 3 reports the means of four characteristics of cable systems, the basic rate (adjusted for inflation), the number of subscribers, the total number of broadcast signals carried, and the number of distant signals carried. The differences between our sample and the universe of Form 3 systems appear so small that the results of our statistical analysis are likely to be applicable to all Form 3 systems. [54]

[54] Counsel for MPAA provided us the universe averages by accounting period for each of the four characteristics based on Cable Data Corporation data. Using these data, we calculated the

Conclusion

The results reported in this testimony, in which estimates of the value to cable operators of the programming on distant signals are based on the behavior of those operators, are remarkably consistent. Using a wide variety of approaches, the share of royalty payments to movies and series claimants ranges between 82 percent and 92 percent and the share for the sports claimants ranges between 5 percent and 11 percent. The calculated share for devotional programming ranges between 1.5 percent and 2 percent while that for local programming ranges between 1 percent and 9 percent under assumptions that are very favorable to these claimants. The "true" shares for these claimants are likely to be considerably below those estimated here, and may even be zero.

This relatively narrow range of outcomes results despite different specifications of the underlying equation and different datasets. The fact that the shares are relatively insensitive to these changes should give the Panel considerable confidence in their validity.

---

weighted average for each characteristic across accounting periods, where the weights are the number of reporting systems as a percent of the number reporting in all the accounting periods, 1988-I through 1992-II.

I declare under penalty of perjury that my testimony is true and correct and of my personal knowledge.

Executed on August 15, 1995.

Stanley M. Besen

Certificate of Service

I hereby certify that on Monday, February 12, 2018 I provided a true and correct copy of the Stanley Besen Written Direct Testimony (JSC Written Rebuttal Statement Vol. II) to the following:

MPAA-represented Program Suppliers, represented by Lucy H Plovnick served via Electronic Service at lhp@msk.com

National Association of Broadcasters (NAB), represented by John Stewart served via Electronic Service at jstewart@crowell.com

Spanish Language Producers, represented by Brian D Boydston served via Electronic Service at brianb@ix.netcom.com

Devotional Claimants, represented by Matthew J MacLean served via Electronic Service at matthew.maclean@pillsburylaw.com

Canadian Claimants Group, represented by Lawrence K Satterfield served via Electronic Service at lksatterfield@satterfield-pllc.com

National Public Radio, Inc. (NPR), represented by Gregory A Lewis served via Electronic Service at glewis@npr.org

Broadcast Music, Inc. (BMI), represented by Jennifer T. Criss served via Electronic Service at jennifer.criss@dbr.com

Public Broadcasting Service (PBS), represented by Dustin Cho served via Electronic Service at dcho@cov.com

SESAC, Inc., represented by Christos P Badavas served via Electronic Service at cbadavas@sesac.com

Multigroup Claimants, represented by Brian D Boydston served via Electronic Service at brianb@ix.netcom.com

American Society of Composers, Authors and Publishers (ASCAP), represented by Sam Mosenkis served via Electronic Service at smosenkis@ascap.com

Signed: /s/ Michael E Kientzle